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This paper begins with a basic overview of strategic guidance driving the U.S. to shift its focus to the Asia-Pacific region. Additionally, it provides a brief background on A2/AD, and the Air-Sea Battle strategy in order to form the foundation for follow-on discussion and analysis. The paper then provides a thorough review of current Chinese A2/AD capabilities, and projected advancements over the next decade. Next, the paper presents a hypothetical scenario involving Chinese A2/AD attack along with projected impacts on the U.S. Following this, the paper proposes application of the Air-Sea Battle strategy as a theoretical U.S. response to the Chinese A2/AD threat. The paper concludes with a discussion on actions that the U.S. should take to counter aggressive Chinese military growth in the Asia-Pacific in order to preserve safety and stability for the U.S. and its allies in the region.

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TITLE:

REBALANCING TO THE ASIA-PACIFIC REGION, AND CHALLENGES OF ANTI-ACCESS/AREA DENIAL & THE AIR-SEA BATTLE STRATEGY

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EXECUTIVE SUMMARY

TITLE: Rebalancing to the Asia-Pacific Region, and Challenges of Anti-Access/Area Denial & The Air-Sea Battle Strategy

AUTHOR: Andrew C. Marsiglia II, Major, USAF

THESIS: The Air-Sea Battle strategy provides a viable model for addressing major U.S. shortcomings and issues associated with countering China's emerging anti-access/area denial (A2/AD) threat, and will enable the U.S. to refocus efforts on the Asia-Pacific region.

DISCUSSION: This paper begins with a basic overview of strategic guidance driving the U.S. to shift its focus to the Asia-Pacific region. Additionally, it provides a brief background on A2/AD, and the Air-Sea Battle strategy in order to form the foundation for follow-on discussion and analysis. The paper then provides a thorough review of current Chinese A2/AD capabilities, and projected advancements over the next decade. Next, the paper presents a hypothetical scenario involving Chinese A2/AD attack along with projected impacts on the U.S. Following this, the paper proposes application of the Air-Sea Battle strategy as a theoretical U.S. response to the Chinese A2/AD threat. The paper concludes with a discussion on actions that the U.S. should take to counter aggressive Chinese military growth in the Asia-Pacific in order to preserve safety and stability for the U.S. and its allies in the region.

CONCLUSION: China's massive military growth and emerging A2/AD capabilities highlight U.S. vulnerabilities in the Asia-Pacific region. Air-Sea Battle is a U.S. strategy for overcoming challenges that will enable the country to project its power and influence in the Asia-Pacific region over the next decade/into the future.

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INTRODUCTION

At the beginning of World War II, the U.S. military was massively unprepared for the demands placed on its air and naval forces. However, as the war progressed the U.S. recovered as its industrial complex made tremendous advances that enabled the country to emerge as a dominant world power. Over the last 60 years, the U.S. has continued to enjoy unprecedented control of the air and sea as no country has been able to successfully challenge or oppose it in either domain. When the Soviet Union collapsed in 1991, there was no near peer competitor in sight. However, over the past five years China has invested large amounts of money developing its military, and has emerged as a major force to challenge U.S. influence and stability in the Asia-Pacific region over the next decade. As such, the Air-Sea Battle strategy—in essence an integrated, combined, joint air/sea concept—provides a viable model for addressing major U.S. shortcomings and issues associated with countering China's emerging anti-access/area denial (A2/AD) threat, and will enable the U.S. to refocus efforts on the Asia-Pacific region.[1]

BACKGROUND

Strategic Guidance on Asia-Pacific Region

In the later part of 2011, U.S. leadership signaled that as the wars in Iraq and Afghanistan wound down the U.S. would begin rebalancing to the Asia-Pacific. Secretary of State Hillary Clinton indicated that the U.S. would seek to "…lock in a substantially increased investment—diplomatic, economic, strategic, and otherwise," and that U.S. presence is vital to economic security and prosperity in the Asia-Pacific region.[2] Then in November 2011, President Barack Obama, during a visit to Australia and the Asia-Pacific announced that the U.S. would expand its role in shaping the region by increasing the country's military presence, and as such directed his national security team to make this a top priority.[3]

Following these announcements, the U.S. released, *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense* (i.e. the Defense Strategic Guidance), in January 2012. In this policy, the President stated, "Indeed as we end today's wars, we will focus on a broader range of challenges and opportunities, including the security and prosperity of the Asia Pacific."[4] Furthermore, it expounds upon this idea saying:

> Accordingly, while the U.S. military will continue to contribute to security globally, we will of necessity rebalance toward the Asia-Pacific region. Our relationships with Asian allies and key partners are critical to the future stability and growth of the region. We will emphasize our existing alliances, which provide a vital foundation for Asia-Pacific security. We will also expand our networks of cooperation with emerging partners throughout the Asia-Pacific to ensure collective capability and capacity for securing common interests.[5]

Clearly, rebalancing to the Asia-Pacific extends beyond U.S. military interests in the region. However, the purpose and scope of this paper will focus on military planning, A2/AD, and the U.S. ability to project power using an Air-Sea Battle strategy in the Asia-Pacific.

Anti-Access/Area Denial (A2/AD)

From a strategic perspective, A2/AD threats are challenges to the U.S. in terms of the four instruments of national power: diplomacy, information, military, and economic. A2/AD poses direct threats to the "security and prosperity of the United States and its allies, [and] an open and stable international system…."[6] Specifically, A2 challenges are used to "…exclude U.S. forces from a foreign theater or deny effective use and transit of the global commons."[7] The enemy may also use politics or economic means to negate U.S. influence in a region or zone. From a military perspective, the adversary may deny basing, staging, transit, or over-flight rights. As tensions rise, the enemy may employ lethal A2 methods utilizing "ballistic missiles, submarines, weapons of mass destruction (WMD), offensive space and cyberspace," terrorism,

and/or proxy warfare in order to make U.S. intervention too costly or unacceptable; thus, the enemy reduces or eliminates introduction of U.S. forces into the region of conflict.[8]

Once in theater, AD actions prevent movement of U.S. forces in the area under the enemy's direct control. As such, AD operations include action taken by the enemy "in the air, on land, [on/under] the sea…[in] space, and cyberspace" to deny U.S. joint operations within the battlespace.[9] These actions can prevent the U.S. from quickly achieving its objectives, and like A2 can impose high, undesirable, ever-mounting costs for long-term operations. As tensions escalate, lethal AD actions ensue as the enemy has a number of weapons to choose from. They include employing "…cruise [and] ballistic missiles, submarines..., chemical, biological, and radiological agents, mines, guided rockets, mortars and artillery, electronic warfare, and short-range/man portable air defense and anti-armor systems."[10] With the boom in technology, the enemy can leverage personal computers, communications, and networks to further increase lethality. Technology also increases the range of enemy actors who vary "from individuals and loosely organized groups to sophisticated regional powers.[11] Further complicating the AD threat is the organizational structure of the enemy/enemies. They may be structured or unstructured, devolve from structured to unstructured, be sophisticated or not, and lack a centralized command and control structure. This makes U.S. targeting and defeat of them problematic.[12]

Air-Sea Battle Concept/Strategy

The 2010 Quadrennial Defense Review directed the U.S. Air Force and Navy to develop a joint Air-Sea battle concept to address the challenge of defeating the enemy across the range of military operations, and in particular, those equipped with A2/AD capabilities. Air-Sea Battle's charter is to develop a method or strategy to integrate air and naval force capabilities across air, sea, land, space, and cyberspace in order to counter a vast array of challenges to U.S. forces

including A2/AD.[13] On February 20, 2012, Air Force Chief of Staff, General Norton Schwartz, and Chief of Naval Operations, Admiral Greenert penned an article for *American Interest* outlining the key concepts of Air-Sea Battle. At its core, Air-Sea Battle brings together the Air Force and Navy as they develop a strategy to protect global commons, which is vital to ensuring the Joint Force is able to access the operational area. Air-Sea Battle's success depends upon timely, interconnected operations across the battlespace. Furthermore, it "…provides the concepts, capabilities, and investments needed to overcome the challenges posed by emerging threats to access like ballistic and cruise missiles, advanced submarines and fighters, electronic warfare and mines."[14]

Moreover, integration, interdependence, interoperability, communication, and effectiveness are at the heart of the Air Force/Navy partnership. Actions along these lines of effort support the Joint Force, and allow for better integration of processes used to prepare personnel for deployments. In turn, efforts in these areas lead to effective organizational, operational, and acquisition strategies. Consequently, Air-Sea Battle serves as a guide for Air Force and Navy Title 10 responsibilities that in-turn form the foundation needed to operate as a Joint Force.[15]

Another key concept nested within Air-Sea Battle is the ability to disrupt, defeat and destroy A2/AD threats known as "Networked, Integrated Attack-In-Depth." "Networked" refers to the ability to establish resilient communications networks between people, organizations, and forces to counter A2/AD. "Integrated" highlights tight coordination between air and naval forces that enable them to put the enemy at risk across the domain. "Attack-In-Depth" speaks towards the joint Air Force/Navy ability to attack the enemy wherever needed to achieve operational objectives.[16]

Air-Sea Battle takes "jointness" to a new level by establishing relationships, and a construct that continually encourages collective training, integration, and development of the force. As a result, U.S. military/expeditionary credibility grows, and fosters international confidence in U.S. capabilities. This creates a foundation for regional stability and security. As such, Air-Sea Battle is an essential military concept/line of effort. It serves as the basis for developing a comprehensive strategy to ensure U.S. military freedom of action and power projection across the globe.[17]

DISCUSSION AND ANALYSIS

Current and Projected Chinese A2/AD Capabilities

In 2010, the Center for Strategic and Budgetary Assessments projected that over the next decade China's People's Liberation Army (PLA) would continue to develop substantial military capabilities to challenge the U.S. and its allies in the Asia-Pacific region. The Chinese have made great strides in developing "kinetic and non-kinetic anti-satellite (ASAT) weapons, space launch and space surveillance infrastructure, cyber and electronic warfare capabilities, [and] long- range Intelligence Surveillance, and Reconnaissance (ISR) systems."[18] In 2001, the U.S. Director of Intelligence testified to Congress that the Chinese would have substantial ASAT capabilities by 2015. A year after his testimony, he revised the estimate to 2010. Then in 2007, the Chinese successfully destroyed one of their own inoperative satellites demonstrating to the world that they had arrived on the scene as a serious space competitor.[19] The PLA has also developed ground-based ASAT laser systems. In the near future China can reasonably be expected to have ASAT weapons to put U.S. mid-orbit/Global Positioning System (GPS) satellites at risk.[20] Moreover, the Chinese have substantial non-kinetic capabilities. In recent years, the U.S. has been the target of cyber attacks and probes from China that steal information. Additionally, the Chinese have launched numerous hacking and malicious logic software

attacks.[21] China's rapid development and capabilities present serious challenges and concerns with regards to U.S. power projection operations as they could disrupt U.S. precision guided weapons, unmanned aerial vehicles (UAVs), and computer networks vital to timely and efficient movement of personnel and equipment.[22]

The Chinese are also rapidly moving forward with development for thousands of "precision-guided conventional land-attack and anti-ship cruise and ballistic missiles that can be launched from air, naval, and land-based mobile ground platforms…(see Figure 1)."[23]

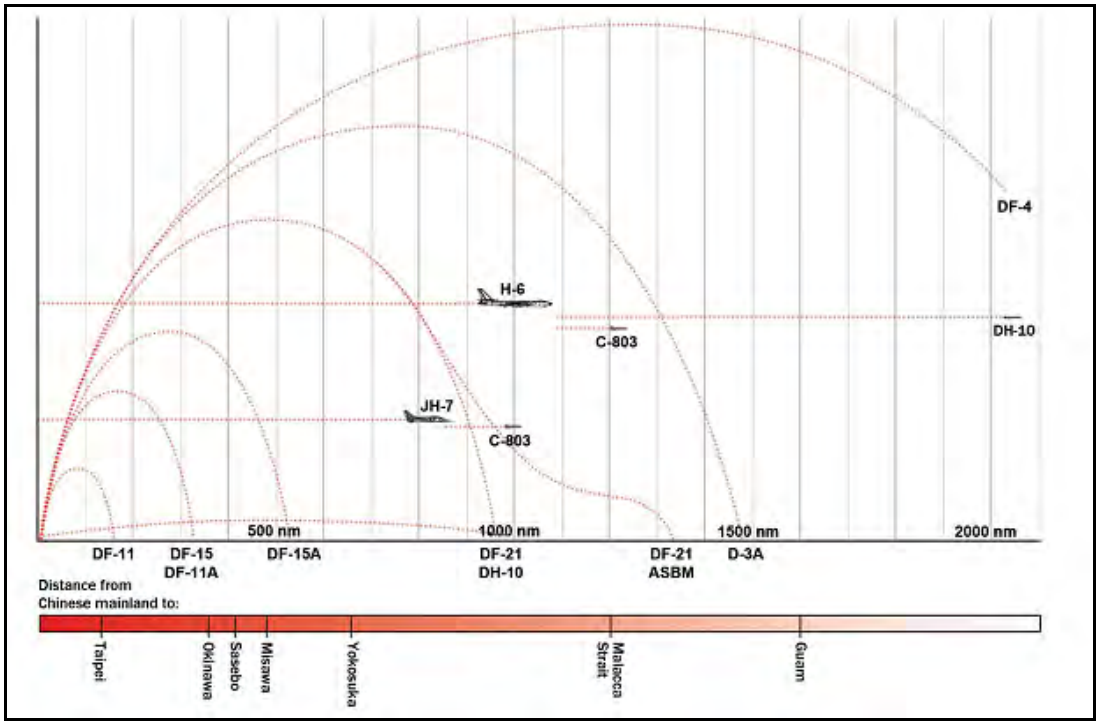

Figure 1: Range of PLA Missiles and Strike Aircraft (Combat Radius, Unrefueled)
Source: **Jan Van Tol, Mark Gunzinger, Andrew Krepinevich, and Jim Thomas, *AirSea Battle: A Point-of-Departure Operational Concept,* Center for Strategic and Budgetary Assessments. (Washington, DC: Center for Strategic and Budgetary Assessments, April 1, 2010), 18, http://www.csbaonline.org/publications/2010/05/airsea-battle-concept/**

Utilizing these assets, the Chinese would have the capability to "conduct preemptive strikes (including cyber strikes) on U.S. theater ports and airfields," aircraft carriers, surface combatants, logistics, transportation, support forces, and battle networks, thus giving them leverage over key allies in the region who may choose to deny U.S. forces access to their bases for fear of being

attacked as well.[24] As of 2010, the Chinese had 1,100 mobile short-range ballistic missiles (SRBMs) opposite of Taiwan, and they were increasing that number at a rate of 100 per year. The Chinese have continued to advance their technology, and newer generations of missiles continue to have "greater range, enhanced accuracy, and the ability to carry conventional payloads…."[25] Furthermore, China increased the number of medium-range ballistic missiles (MRBMs) (range 521-1,738 nms) in its arsenal, and improved their guidance systems in order to put bases in the second island chain (i.e. Andersen Air Force Base and naval facilities in Guam) at risk (See Figures 2 and 3 below). MRBMs are capable of delivering conventional, WMD (i.e. nuclear) munitions.[26]

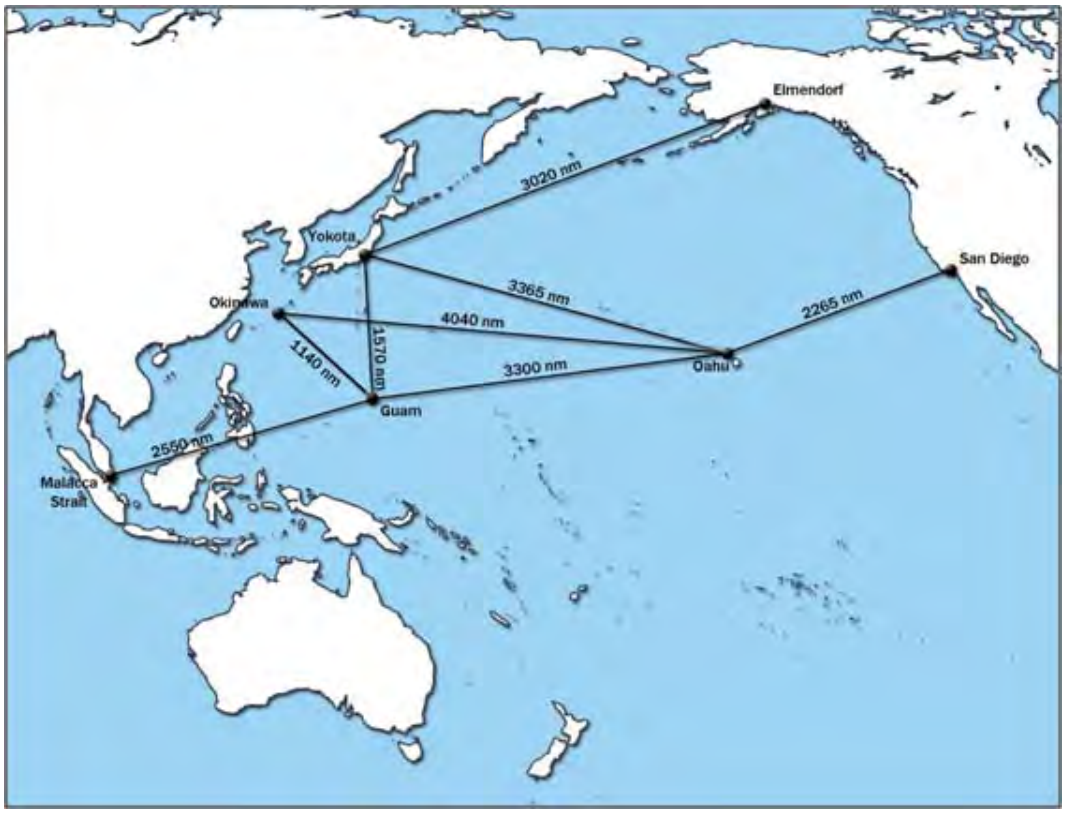

Figure 2: Illustrative Distances in the Pacific Theater
Source: **Jan Van Tol, Mark Gunzinger, Andrew Krepinevich, and Jim Thomas, *AirSea Battle: A Point-of-Departure Operational Concept,* Center for Strategic and Budgetary Assessments. (Washington, DC: Center for Strategic and Budgetary Assessments, April 1, 2010), 12, http://www.csbaonline.org/publications/2010/05/airsea-battle-concept/**

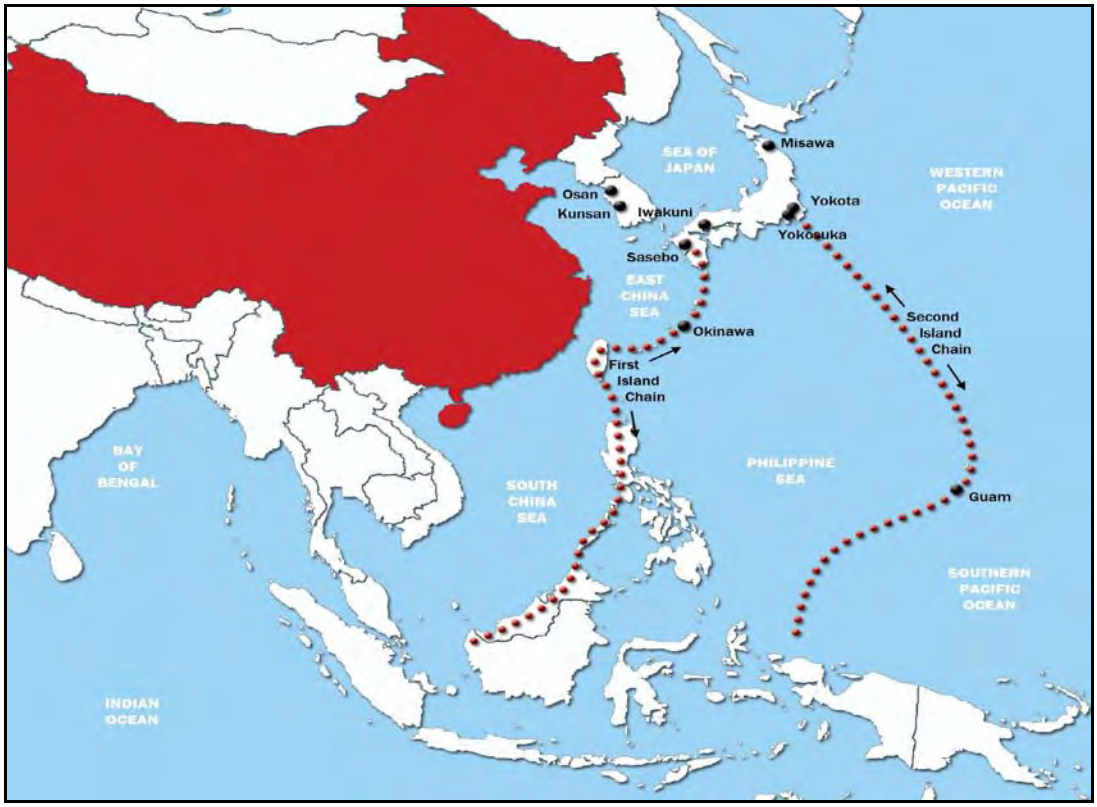

Figure 3: The Two Island Chains and Major U.S. Bases in the Western Pacific
Source: **Jan Van Tol, Mark Gunzinger, Andrew Krepinevich, and Jim Thomas, *AirSea Battle: A Point-of-Departure Operational Concept,* Center for Strategic and Budgetary Assessments. (Washington, DC: Center for Strategic and Budgetary Assessments, April 1, 2010), 13, http://www.csbaonline.org/publications/2010/05/airsea-battle-concept/**

Additionally, China is upgrading its air forces. The PLA Air Force (PLAAF) is modernizing its FB-7A fighter-bomber to support its F-10 and SU-30MKK multirole strike aircraft, and upgrading its H-6 bombers in order to enable them to carry long-range cruise missiles.[27]

China's maritime growth/projected growth will also result in a vast expansion of A2/AD capabilities. The PLA Navy (PLAN) is projected to develop a substantial number of quiet diesel submarines (some of which will be nuclear capable), supersonic sea-skimming anti-ship cruise missiles (ASCMs), advanced torpedoes, a force of ballistic missile submarines (SSBNs), and tens of thousands of advanced sea mines.[28] These assets will possess the capability to destroy, and/or deny U.S. fleet access within the second island chain (See Figure 3). China already has

access to Russian anti-carrier weapons, weapons capable of preventing U.S. carriers from deploying close enough to mainland China to launch aircraft strikes.[29]

Chinese strategy documents also indicate a keen interest in stealth warships and new-style submarines as they upgrade their fleet. This interest in derived from the fact that the PLAN recognizes its current fleet of diesel-electric boats with poor underwater endurance at high speeds is not capable of effectively executing A2/AD operations. As such, the submarine fleet in its current state is best suited for barrier operations aimed at destroying U.S. Carrier Strike Groups (CSGs).[30] However, evidence over the past fifteen to twenty years shows movement to remedy this deficiency as China acquired ten Russian Kilo-class submarines armed with advanced wake-homing and wire-guided torpedoes. These Kilos along with the Song-class are guided missile submarines (SSGs) that can fire ASCMs from underwater. The Kilos also come with SS-N-27B Sizzler ASCMs which possesses the capability to defeat the U.S. Aegis anti-air warfare system, and breach task force defense mechanisms. Even with its shortcomings, the PLAN submarine fleet is still a viable A2/AD force capable of inflicting significant and perhaps prohibitive damage on the U.S. Navy.[31]

The Chinese also possess substantial air capabilities associated with their Army and Navy air forces (PLAAF and PLANAF), which are capable of employing cruise missiles. The PLANAF H-6 aircraft carries six ASCMs, and has a combat radius of 1,600 nms. Additionally, it is capable of delivering Russian Kh-31A Mod 2 anti-ship cruise missiles, which is an active radar missile with a range just over 50 nms. The H-6 also carries Kh-31PM/PMK missiles. These anti-radiation missiles have a range of 100 nms, and are specifically designed to attack the "…US Navy's SPY-1 radar, the E-2 Hawkeye carrier AEW radar, the Air Force's AWACS, and the Army's Patriot fire control radar."[32] The People's Republic of China (PRC) also has Russian

Su-30MKK2 land-based strike fighters. These aircraft have a range of 1,400 nms, and are comparable to the U.S. F-15E Strike Eagle. Together, these fighters pose serious threats to naval assets, and possess ranges greater than all manned U.S. carrier air wing strike aircraft.[33] Moreover, the PLAAF and PLANAF are building 500 new fourth-generation fighters. Coupled with their A-50 AWACS and air tankers (H6U and II-78MKKs), the PLA forces will be a substantial force to be reckoned with in the Western Pacific.[34]

In addition to the aforementioned air and maritime assets, the Chinese have DF-21 anti-ship ballistic missiles (ASBMs). DF-21s will have warheads equipped with penetrating projectiles (kinetic) or high-power microwave emitting/electromagnetic pulse technology (non-kinetic) designed to disable, and thus deny U.S. carrier access to the region.[35] China is also "developing or deploying maritime surveillance and targeting systems…[such as] over-the-horizon backscatter (OTH-B) radars, land-based over-the-horizon surface wave (OTH-SW) radars, electro-optical satellites, and radar satellites that can detect U.S. ships at extended ranges."[36] Moreover, China is moving forward "on as many as fifteen different satellites for imagery reconnaissance, electronic and signal intelligence collection, navigation, communications, and weather forecasting" while simultaneously deploying eight different kinds of advanced imagery and reconnaissance satellites.[37]

Lastly, in an effort to further solidify their presence in the Western Pacific, the Chinese have made substantial investments in surface-to-air-missiles (SAMs). There is a dense network of SAM launch sites and radar systems on the east coast of China specifically centered on the Taiwan Straits. Furthermore, the Chinese are upgrading with the Russian S-300PMU2 SAM systems with ranges of just under 108 nms.[38] The PRC is also hardening and protecting sites that house their systems, radars, and the command and control networks that form this defense

network. This coupled with their SAM capabilities further complicates penetration of their airspace in the event of conflict.[39]

Hypothetical Scenario for Chinese A2/AD Attack & Impacts on the U.S.

Chinese A2/AD Pre-Emptive Attack

In order to explain how Air/Sea Battle works, it is important to establish in broad terms how such a Chinese A2/AD threat/operation might reasonably play out in the future. The following is a hypothetical scenario explaining how China would go about asserting its power in the Western Pacific. According to the *AirSea Battle: A Point-of-Departure Operational Concept* report published by the Center for Strategic and Budgetary Assessments, in a potential conflict, the Chinese will seek to immediately:

> …render the U.S. and allied forces 'deaf, dumb and blind' by destroying or degrading U.S. and allied Low Earth Orbit (LEO) ISR, Space-Based Infrared System (SBIRS), third-generation Infrared System (3GIRS) sensors and communications satellites. This would be accomplished by employing direct-energy weapons, direct-ascent and co-orbital anti-satellite weapons, or terrestrial jamming, in concert with coordinated cyber and electronic warfare attacks.[40]

In conjunction with this, the Chinese will launch ballistic and cruise missile attacks along with airstrikes on U.S. and Japanese air and naval bases at Kadena and Misawa. Moreover, they will take out logistics nodes in Guam to include U.S. air and naval facilities along with key fuel storage sites. These acts would render the U.S. incapable of projecting combat power.[41] Additionally, the Chinese will utilize ASBMs and ASCMs to strike U.S. Navy and allied warships within approximately 1,500 nms of China. In short order the PRC will cut U.S. and allied sea lines of communication (SLOCs), and utilize their submarine fleet to stop any movement of U.S. personnel, supplies, or equipment to forward operating bases struck during missile attacks. This would force the U.S. to reassign Navy assets to convoy and anti-submarine warfare (ASW) duties in an effort to counter Chinese control of the sea.[42]

American Philosophies on Power Projection

Over the past 60 years, the U.S. has been able to project its power virtually unopposed. According to the Center for Strategic and Budgetary Assessments, key tenets of this philosophy that constitute the American way of doing business include:

> - Rapidly deploying substantial air, ground and naval forces to forward bases and littoral seas;
> - Creating rear-area sanctuaries for U.S. forces and logistics build-ups;
> - Tracking enemy activities and denying same to enemy;
> - Initiating combat operations at a time and place of U.S. choosing;
> - Generating and sustaining large numbers of air sorties; and (more recently)
> - Activating complex battle networks and buying up satellite bandwith[43]

In light of current and future Chinese advancements, these assumptions are no longer valid. Chinese capabilities have and will continue to advance to levels that will prohibit the U.S. from operating in such a manner. Furthermore, China will have the initial advantage, and it is likely they will capitalize on these tenets first, thus "beating the U.S. to the punch."

Consequence of a Chinese Pre-Emptive Attack: Impact on the Physical Domain

In the event of a Chinese pre-emptive attack, the U.S. will lose access to physical domains/areas crucial to air, ground and naval operations. As a result, the U.S. will not be able to generate the same number of sorties as it did in past conflicts. Furthermore, the country will not be able to generate sorties as quickly. Second, the country will not be able to sustain the same levels of ISR and ASW coverage. Third, reduced access to the theater of operations will increase demands on aerial refueling. Fourth, reduced access will lengthen supply chains, and inhibit the flow of resources to forward operating bases. Fifth, navy ships and submarines will have to transit greater distances for resupply. Consequently, this will reduce the amount of time, assets, and ordinance available for combat operations. Increased Chinese A2/AD activities will

reduce U.S. capabilities by straining its lines of communication, and reducing the country's ability to conduct operations.[44]

The Chinese are utilizing, and will continue to improve upon sensors employed both above and below the surface of the sea. China's advanced anti-ship sensors and weapons systems will make it difficult for U.S. Navy ships to operate at ranges closer to shore/targets. Additionally, the range of China's anti-ship capabilities will continue to outweigh the offensive weapons technology/capabilities aboard U.S. ships.[45] Moreover, U.S. submarine abilities to operate in the littoral waters of the East and South China Seas will be complicated by many factors. The undersea environment is noisy, and impedes the U.S.'s ability to track Chinese submarines. To complicate this phenomenon, the Chinese may employ acoustic jamming technologies to further "noisy" the waters.[46] Also, there are a substantial number of undersea commercial measurement devices being used to support scientific experiments/work. The Chinese could tap into this technology, and use it to track and attack U.S. submarines. China has already deployed some of their own assets in waters off their east coast, and will further develop this technology over the coming decade as a deterrent to the U.S.[47]

Since World War II, the U.S. has enjoyed dominance in the air domain. China's highly integrated air defense systems (IADS) will severely challenge the U.S.'s ability to strike its mainland targets. Additionally, China's ability to conduct missile strikes on U.S. forward operating bases and carriers (where U.S. strike missions would originate) creates problems for the U.S. when it comes to projecting sufficient power into the littoral regions. Moreover, the predominance of U.S. strike capability resides in its fleet of short-range attack aircraft. Without air-refueling support (that could itself be put at risk) forward operating locations/platforms are a necessity for U.S. operations against China.[48]

Consequence of a Chinese Pre-Emptive Attack: Impact on the Virtual Domain

The U.S. relies heavily on high-bandwidth connectivity and space-based technology when it comes to employing communications, ISR, and precision-guided munitions (PGMs) to strike, and assess the results of strikes against enemy targets. The Chinese already have a nominal capability to inhibit/deny the U.S. access to this technology. In the coming years, China will advance this capability to a level that enables them to jam and destroy U.S. space-based assets.[49] Moreover, it is reasonable to project that China will develop its own space-based technologies, and that they would be a target of U.S. strikes. In the event that both the U.S. and China take each other's capabilities out, China would still have the advantage being the "home team." China already has a land-based connectivity system, smaller areas to defend/cover, and as such would be in a better position to develop work-around solutions as compared to the U.S. who would be trying to cover vast areas with a relatively small land-based footprint and fewer alternatives to overcome ever-mounting challenges.[50] The loss of space would be a crippling blow to a country like the U.S. whose ability to wage war is so reliant on the virtual domain.

China is also making large investments to develop a robust cyber warfare capability. The Chinese already incorporate cyber warfare in their exercises, and their president has made funding of this capability a high priority. In fact, there are strong indications that the PLA will create a Cyber Command in the future. According to the Center for Strategic and Budgetary Assessments, current assessments of Chinese capabilities reveal they are:

> - Conducting peacetime access, reconnaissance and exploitation of enemy networks;
> - Implanting of trap-doors, Trojan Horses, or logic bombs that could be activated in the event of war;
> - Executing pre-emptive cyber attacks aimed at corrupting enemy information systems, communications, and databases; [and]
> - Introducing false information into information networks as part of broader deception operations…[51]

China will target U.S. military systems at the outset of conflict. Beyond that, there are indications that Chinese cyber attacks will also target U.S. civilian finance, logistics, and transportation networks. The U.S. relies on its ability to transmit huge amounts of information across classified and unclassified systems that link/interconnect to civilian networks. Over the past 20 years, the U.S. has not been seriously challenged in the cyber arena. China's arrival on the scene and its ever-increasing ability to negatively impact military operations and power projection are a serious threat to U.S. interests in the Pacific.[52]

Consequence of a Chinese Pre-Emptive Attack: Impact on the Strategic & Operational Initiative

In the event of a Chinese attack, the PRC will seize both the strategic and operational initiative. Flexible deterrence options that the U.S. would otherwise employ to discourage a pre-emptive strike may in fact have the opposite effect and push the PLA towards such actions, thus putting the U.S. in a precarious situation. When the PRC strikes, it will do so because it believes that U.S. forward operating forces are sufficiently vulnerable, and the relative up side of attacking with long-range precision-guided munitions outweighs the negative impacts of any potential future U.S. response. However, failure on the part of the U.S. to take action prior to or after any pre-emptive strike by the Chinese would send the wrong message to U.S. allies in the region with regards to U.S. resolve and the ability to counter aggressive PRC activities in the Western Pacific.[53]

Undoubtedly, China's pre-emptive strike will seek to end hostilities rapidly as it secures gains, and achieves its strategic objectives. In a perfect scenario, China will seek to damage the U.S. at the outset to such a degree that a rapid near-term response would be impossible. Furthermore, China will look to continue attacking both the U.S. and its allies in order to prevent the U.S. from seizing its own operational and strategic objectives in a counterattack. China's

goal is to increase the stakes of a U.S. response to a level where the American people would be unwilling to support such action given that victory would most assuredly only be achievable through a long drawn out war.[54]

Application of Air-Sea Battle Strategy as a Counter to the Chinese A2/AD Threat: Theoretical Model for Response

Key Assumptions

It is important to lay out some basic assumptions before proceeding with any discussion on a theoretical U.S. response. According to the 2010 Center for Strategic and Budgetary Assessment report, *Air-Sea Battle: A Point-of-Departure Operational Concept*, the following seven assumptions form the basis upon which follow-on Air-Sea Battle arguments are built. First, China will initiate conflict. The U.S. will not execute a pre-emptive strike, and as such must be able to "absorb" China's first blow. Second, neither the U.S. nor China will utilize nuclear weapons throughout the conflict. The conflict that ensues will be of a conventional nature, and one that does not employ the use of WMDs. Third, when acts of aggression occur there will be strategic warnings, but execution and timing at the strategic and tactical levels will be a surprise. Fourth, U.S. allies in the region, Japan and Australia will be key players in the conflict. Thus, China will have to divert resources to attack allied forces, resources that would otherwise be available to conduct operations against the U.S. Additionally, Japan and Australia provide the U.S. with strategic depth, and key areas/facilities from which to launch campaign operations. Fifth, there are no "non-targetable/off-limit" areas. China has key assets that form the core of their to A2/AD capability. As such, the U.S. must be able to put them at risk. The inability of U.S. military personnel to target these assets would be detrimental to the overall deterrence mission. Sixth, the space domain and the resources operating therein are also viable targets for both China and the U.S. Seventh, a long drawn out war is in the best interests of the

U.S. During such a prolonged conflict, the U.S. must exert pressure on China's commerce and economy. Moreover, the U.S. must prevent the Chinese from obtaining a quick victory, or creating a situation where America (and therefore its allies) would be unwilling to invest the resources needed to extend and bring the war to a successful conclusion.[55]

Stages of Conflict & Accompanying Lines of Effort

Overall, Air-Sea Battle has two stages, and multiple lines of effort. According to the Center for Strategic and Budgetary Assessments, during the first stage, U.S. lines of effort will need to focus on:

> - Withstanding the initial attack and limiting damage to U.S. and allied forces and bases;
> - Executing a blinding campaign against PLA battle networks;
> - Executing a suppression campaign against PLA long-range, principally strike systems;
> - Seizing and sustaining the initiative in the air, sea, space and cyber domains.[56]

The lines of effort are in no particular order. Furthermore, the U.S. will conduct lines of effort/ their subcomponents both simultaneously and sequentially depending on what is called for in the campaign plan. During the second stage of Air-Sea Battle the U.S. will introduce additional lines of effort in order to bring an end to the conflict with China while turning back the gains they made. Again, according to the Center for Strategic and Budgetary Assessments, U.S. lines of effort will need to include:

> - Executing a protracted campaign that includes sustaining and exploiting the initiative in various domains;
> - Conducting 'distant blockade' operations;
> - Sustaining operational logistics; and
> - Ramping up industrial production (especially precision-guided munitions).[57]

There will be no distinctions made concerning simultaneity or the sequence of execution between stages one, two, or their lines of effort. Each stage and the accompanying lines of effort will proceed according to operations unfolding in theater between the U.S. and China.

Stage I- The Opening Act & Main Effort

In order to withstand China's first strike the U.S. will have to "batten down the hatches." The U.S. will need to take actions that enable them to sustain execution of the highest priority missions. However, the primary focus will be taking as many defensive measures as possible to protect key/high-value assets. The U.S. will need to activate attack warning systems, relocate high-value assets to hardened shelters, and move ballistic missile defense (BMD) assets to designated locations and areas outside the range of PLA A2/AD threats. Moreover, the U.S. will need to prepare for rapid relocation, dispersal, and repair of aircraft along with the accompanying logistics support needed to keep the fleet operating over a geographically disparate environment. Safeguarding air assets will enable the U.S. to get back in the fight quicker, and also contribute towards depletion of PLA ballistic missiles (i.e. missiles fired will fail to accomplish their objective).[58] During this phase, the U.S. and its allies will work in concert with each other on ASW operations inside the First Island Chain to support ISR, joint strike missions, and operations against targets under the sea. This will enable the U.S. to begin putting China at risk for retaliatory action. Moreover, ASW will allow the U.S. to defend U.S. ports, airfields, and naval bases in the region.[59] As the phase progresses, the U.S. will be able to flow air and missile defense assets into Japanese bases as needed to offset lost capabilities at U.S. airbases struck by China during initial combat operations. The U.S. must also look to move additional air/naval assets and precision-guided munitions into theater with the help of convoy escorts.[60]

Next, the U.S. will seek to "blind" the Chinese as part of a key line of effort laid out in Air-Sea Battle. As such, the U.S. will take out PLA space/satellite systems using both kinetic and non-kinetic (cyber strikes) means. This will render the PLA incapable of conducting battle damage assessments (BDA) on key targets, and thus unable to ascertain U.S. actions taken to

replace, repair, or remediate damage to key infrastructure and assets. "Blinding" actions will serve as a mechanism to further deplete PLA missiles. Moreover, U.S. dispersal of assets across the region (for all intents and purposes invisible to the PLA) further exacerbates the costly PLA BDA problem as the PLA must randomly "pick and choose" which sites it thinks warrant further strikes in the face of ever-dwindling missile inventories.[61] Furthermore, "blinding" the PLA includes attacking ISR systems with the intent of destroying or degrading their capabilities. The U.S. will again use kinetic and non-kinetic strikes to attack the PLA's OTH radars, sensors, communication relay platforms, and sea-bottom arrays. This will prevent the PLA from locating and tracking U.S. aircraft, ships, and submarines.[62]

Offensive operations against the Chinese are important. However, the U.S. approach must also devise alternative methods of targeting the PLA in light of the fact that the PLA will more than likely inflict substantial damage on U.S. space-based/ISR systems at the outset of conflict. The U.S. must take steps to robust defense of its support aircraft, airborne sensors, and communications relay platforms against air-to-air missiles.[63] However, the U.S. also needs to have a plan to field and deploy back-up C2 (command & control) and ISR systems in order to re-establish rudimentary capabilities in a post attack environment. U.S. Air Force and Navy components are experts on the key components of their electronic battle networks. Understanding the new reality of a degraded environment, each service will need to establish priorities for defense of back-up systems (i.e. those currently in use), and reconstitution of the old ones (i.e. the advanced systems knocked out in initial PLA strikes) with a particular eye on what is best for the Joint Force as opposed to service-specific requirements.[64]

As the battle continues, Chinese and U.S. forces will degrade or destroy each other's space-based capabilities. Thus the next echelon of battle will be conducted one level down from

space in the sky. The PLA will utilize their fleet of high altitude low observable (HALE) UAVs to extend the range of their airborne ISR networks. This will give the PLA the ability to conduct BDA/surveillance on targets inside the Second Island Chain, and keep U.S. carriers and ships beyond ranges needed to conduct attacks on mainland China. Similarly, the U.S. will utilize UAVs to conduct ISR operations in search of PLA ground, air, sea and undersea targets while also defending key U.S. platforms from PLA attack. In essence, a continuous UAV "scouting battle" will ensue.[65] This is a battle that must be won by the U.S. utilizing both kinetic and non-kinetic means. Under the Air-Sea Battle concept, U.S. CSGs and their wings will take out PLA ISR networks and UAVs, thus precluding launch of air and sea-based ASBMs and ASCMs against allied ships. This is a non-traditional role for CSGs. However, over time CSGs will reduce the PLA threat to an acceptable level, and the CSGs will be able to transition back to their more traditional roles as access to the region is restored.[66] Electronic warfare (EW) will also play a substantial role during this phase of the conflict. The PLA will unleash electronic attacks (EA) on U.S. sensors, data links and communications. In order to counter these attacks, the U.S. must employ electronic protection (EP) measures to include the use of decoys and spoofing to entice PLA attacks on false or low-priority targets. Furthermore, the U.S. will launch EA measures of their own against the PLA to cripple their C2 and ISR systems. The kinetic and non-kinetic means described represent continuous "blinding" efforts on the part of the U.S., efforts critical to winning the "scouting battle."[67]

Another key area that will demand U.S. attention is Chinese missile suppression. In accordance with the concepts outlined by the Center for Strategic and Budgetary Assessments, "Air-Sea Battle calls for Air Force and Navy stealthy long-range strike and support platforms, supported by submarine-launched weapons and sensors, to suppress PLA airborne and ground-

based components of coastal IADS with kinetic and non-kinetic attacks."[68] This will enable the U.S. to use bombers with precision guided stand-off munitions along with manned and unmanned stealth aircraft to target and strike both fixed and mobile missile launching systems along with their accompanying C2 networks on mainland China. To be effective, the U.S. must employ a combination of persistent stand-off and penetrating strikes coupled with deception in order to keep the Chinese guessing on when/where attacks will occur. Moreover, these actions will further degrade China's ability to conduct effective, quantitative missile strikes against key U.S. and allied targets in the region.[69] Additionally, the success of long-range synergistic actions conducted by the U.S. Air Force and Navy will open up the theater, and enable both services to bring in their short-range ISR and strike assets. With new assets in the region, the Navy will be able to utilize their missile defense capabilities to help defend U.S. bases from PLA missile attacks. The Navy will also be able to strike PLA IADS and ISR systems, thus clearing the way for Air Force (and some naval air) missions directed at targets on mainland China.[70]

To achieve success in the Pacific, the U.S. must seize control of the seas. As such, the U.S. needs to mount robust anti-surface warfare (ASUW) and ASW campaigns to destroy the PLA's ASCM capabilities. In order to accomplish this mission, the U.S. will have to take a series of steps as outlined in the *AirSea Battle: A Point-of-Departure Operational Concept* report. These include:

> - Enhancing the air and missile defense of Japan, and extending air superiority over the East China Sea and down the Ryukyus island chain;
> - Conducting sustained standoff and penetrating strikes, using multiple attack axes, against PLA ballistic missile targets (including missile production and storage facilities) as well as strikes to re-attack new or repaired counter-space and long-range sensors sites;
> - Conducting ASUW operations — led primarily by US and allied airborne forces — to deny PLA warships access to the East and South China Seas;

> - Continuing the ASW campaign inside the First Island Chain (principally with submarines complemented by airborne offensive mining missions using stealthy Air Force bombers), while maintaining ASW barrier operations; and
> - Continuing the scouting battle through the attrition of PLA airborne ISR and communications relay assets.[71]

These actions will give U.S. and allied naval forces the ability to operate freely throughout the region, and it highlights the interdependencies between the Air Force and Navy, which is at the core of the Air-Sea Battle strategy.

As established throughout this paper, China's ballistic missile forces will threaten U.S. and Japanese forces in mainland Japan. The most vulnerable area of the mainland will be the western portions of the country. The Chinese PLAAF will also threaten the Ryukyu Island chain, which belongs to Japan. Thus, one of the key missions of Air-Sea Battle will be "robusting" and extending coverage over these areas with the Japanese Air Self Defense Force (JASDF) in order to create safe havens from which to launch missions.[72] Over time, the U.S. in concert with Japan will be able to expand its presence down the Ryukyu chain into the East China Sea. As a result, the U.S. and Japan will increase operations to destroy China's third and fourth generation fighters (Sukhoi Su-30MKKs and J-10s), protect airborne ISR platforms that support sea-denial and ASW operations, and enable maritime strikes against selected Chinese targets. These actions will posture the U.S. and Japan well for follow-on strikes into China, and allow them to continue degrading PLA IADS and missile inventories.[73]

Area denial to the East and South China Seas is one of the key pillars for Chinese defense of the region. Consequently, the U.S. and its allies must break through this defense in order to turn the tide of any future conflict. The Air-Sea Battle strategy calls for a multi-pronged approach involving both the U.S. Air Force and Navy. In particular, Air-Sea Battle calls for heavy use of airborne assets. Under this construct, U.S. Navy submarines will provide

information to air planners on the location of PLA ships. Upon receipt of information, air planners will develop targeting packages that direct aircraft to air-launch ordinance such as ASCMs against enemy combatant ships in the East and South China Seas.[74] With proper training and funding U.S. Air Force UAV/strike fighter pilots and bomber pilots/crews will be well suited to carry out this mission. In summary, these assets will "…form Air Sea Battle anti-surface 'hunter-killer' groups, receiving targeting information from on-board systems and other platforms such as submarines, maritime surveillance aircraft and ISR UAVs, and providing the maritime equivalent of the 'on-call' fires they provide for ground forces."[75]

Submarines are also vitally important to the PLA's maritime A2/AD threat. PLA submarines will employ ASCMs on U.S. surface ships, attack U.S./allied land targets, conduct BDAs, and disrupt U.S./allied SLOCs. Fortunately, for the U.S. and its allies, the PLA submarine program is a source of weakness in the Chinese defense network. PLA submarines do not have the ability to remain at sea (performing their mission) for extended periods of time, and thus must return to bases in China to rearm and refuel.[76] The U.S. already knows the location of PLAN submarine bases, and the areas where the U.S. and its allies will operate to include SLOCs to, from, and between Japan, the Republic of Korea, and Taiwan. As such, "Air-Sea Battle exploits the allies' geographic position and advantage in hydrography to establish anti-submarine barriers along the Ryukyus, and across the Luzon Strait through the Philippine Islands and southern exits from the South China Sea."[77] (See Figure 4)

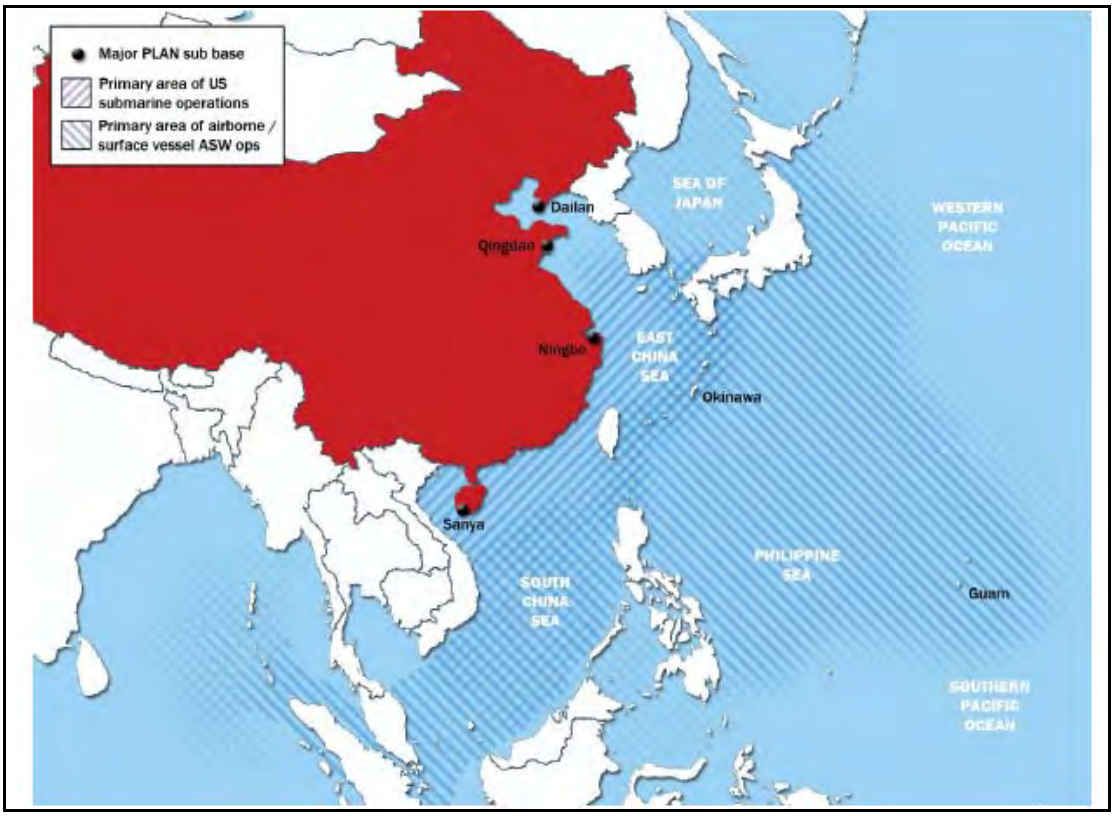

Figure 4: Primary Areas of U.S. Submarine and Anti-Submarine Operations
Source: **Jan Van Tol, Mark Gunzinger, Andrew Krepinevich, and Jim Thomas, *AirSea Battle: A Point-of-Departure Operational Concept,* Center for Strategic and Budgetary Assessments. (Washington, DC: Center for Strategic and Budgetary Assessments, April 1, 2010), 72, http://www.csbaonline.org/publications/2010/05/airsea-battle-concept/**

The Air-Sear Battle strategy also calls for joint Air Force/Navy operations in accomplishing the ASW mission. Aircraft from both services will lay mines, and conduct strikes on PLA submarine bases. Hence, with proper planning, forces, air and sea ASW platforms, offensive mining, air strikes, and undersea arrays such as unmanned undersea vehicles (UUVs), the U.S. and Japanese will be able to exploit natural chokepoints, and apply targeted application of force to defeat/degrade PLA submarine operations and win the ASW campaign.[78]

Stage II- Subsequent Operations Geared Towards Elimination of A2/AD Threat & End of Conflict in the Pacific

Stage II operations to counter the Chinese A2/AD threat will see continued U.S. and allied operations in an on-going, protracted campaign. The U.S. will continue to flow forces,

supplies, and equipment into theater as well as repair damaged forward base infrastructure. As such, the U.S. will need to leverage its industrial base back in the U.S. to build up munitions stockpiles depleted during combat operations with China.[79] At this point, combat operations are still on-going. Keeping this in mind, the U.S. will need to continue assessing the Chinese A2/AD threat, with an eye towards the fact that the PLA will continue repairing their damaged infrastructure and capabilities as well. "The U.S. and allied forces [will] need to continue the efforts undertaken in the initial phase of operations (e.g., suppressing PLA ballistic missiles, maintaining ASW operations; providing ballistic missile defense, etc.) even while ramping up Stage II protracted campaign operations."[80]

In the coming years, the Chinese are looking to establish access to forward operating bases in key strategic areas outside the Western Pacific Theater of Operations (WPTO). If successful, the U.S. and its allies will need to take action to address diversionary PLA actions originating from these locations. During Stage I operations, various U.S. forces, such as amphibious units, would be too vulnerable to employ inside the First and Second Island Chains due to their susceptibility to PLA A2/AD actions. However, amphibious units would be well suited for the mission of securing PLA forces at forward-based locations outside the region in order to ensure they do not join the fight as Stage II operations progress.[81]

Under Air-Sea Battle a "distant blockade" will need to be implemented. Two of China's biggest trading partners are the U.S. and Japan. Any trade between these two parties and China will cease at the onset of conflict. Additionally, well-defined trade routes exist in the Pacific due to the geography of the region. As such, the U.S. and its allies will be able to strategically place forces at key regional entry/exit points, which are outside the range of most PLA A2/AD threats.[82] Again, assets considered too vulnerable to participate in Stage I operations would be

candidates to enforce the blockade. U.S. Navy Littoral Combat Ships (LCS), patrol craft and small frigates coupled with Air Force bombers that can provide "on-call" strike will be sufficient in enforcing such a blockade that is sure to have a crippling effect on the Chinese economy and its ability to wage war.[83]

One of the most challenging tasks during Stage I, and subsequently Stage II operations, will be sustaining logistics. The U.S. does not have enough bases in the WPTO. Moreover, PLA A2/AD capabilities will inflict substantial damage on the ones that do exist. Furthermore, the lack of secure bases in the Pacific is particularly troublesome for the Navy's surface and submarine fleets that require bases in order to rearm with missiles and torpedoes.[84] Until the U.S. neutralizes the PLA's capabilities, the PLA will continually put U.S. bases in Japan and Guam at risk. As such, the U.S. will need to take steps to mitigate this threat. First, U.S. bases in range of PLA strike must "…employ active and passive defenses both to reduce damage to assets on the ground and to increase the number of PLA missiles required to achieve the desire destructive effects in order to deplete the PLA inventory of longer-range missiles more quickly."[85] Post attack, bases will need to take action to rapidly "get back in the game" by re-establishing critical capabilities lost during PLA strikes. Moreover, the U.S. needs to establish a capability to rapidly set up alternative basing sites similar to the ones Americans set up in the Pacific during World War II in order to mitigate threats/enhance survivability while at the same time conducting deception operations to confound PLA targeting operations.[86] Second, the U.S. needs to work closely with its allies to establish agreements on "…access to bases and facilities for logistical and maintenance purposes in areas such as eastern Japan, Australia, Singapore, and possible other partner states (e.g. India, the Philippines, [and] Vietnam)…."[87] Third, the U.S. will need to dedicate sufficient numbers of ASW forces to protecting SLOCs transiting from the

U.S. to forward operating locations, especially in light of the continuing PLA submarine threat. Finally, the U.S. must transit materials great distances to support theater operations. In order to mitigate this threat, the U.S. must "…[stockpile] war reserve materials such as caches of munitions, maintenance spares, and POL in forward areas such as Australia, Hokkaido, Singapore, the Aleutians, and Hawaii."[88]

RECOMMENDED ACTIONS/WAY AHEAD & CONCLUSIONS

Recommended Actions/Way Ahead

In order to implement the actions outlined above under the Air-Sea Battle Strategy-Theoretical Model of Response, the U.S. will need to take a series of steps predicated upon shoring up defense capabilities, diversifying operations, enhancing offensive strike capabilities, and maximizing interdependencies primarily between the U.S. Air Force, Navy, and its allies in the region. Moreover, the U.S. Department of Defense (DoD) will have to review its own Programs of Record, make course corrections and adjustments where necessary, and invest in research and development of technologies that will enable it to counter China's A2/AD threat in the Pacific.[89]

To build up defense capabilities, the U.S. will need to fund activities to harden air and naval facilities in Guam and Japan. These actions will help increase survivability after PLA missile strikes, and reduce damage to key infrastructure and facilities.[90] Additionally, the U.S. must refurbish and stockpile assets (i.e. fuel, munitions, and aircraft parts) at bare base sites such as Tinian, Saipan, and Palau, sites that will serve as evacuation locations for U.S. forces should PLA attacks destroy major bases in Guam and Japan.[91] Furthermore, the U.S. needs to deploy additional BMD systems to forward-operating bases in the Pacific. This will enable the U.S. Army, Air Force, Navy, and Japan to jointly develop and conduct annual BMD exercises to test

their defense capabilities.[92] Finally, the U.S. must look to expand its sensor capabilities in cooperation with key allies and partners. This "regional network of long-range ground, sea, air and space-based sensors," would give member nations (i.e. Japan, South Korea, Taiwan, Singapore, India, Taiwan, and Australia) "…near real-time warning of broad Chinese military activity, not just missile strikes, from coastal regions to deep into Chinese territory, in order to allow regional governments to pursue individual or coalition defensive responses."[93] A robust network of sensors like this would exceed the capability of the U.S. alone, and go a long way towards reducing surprise pre-emptive PLA strikes and the potential damage they could inflict.

The U.S. (i.e. the Air Force and Navy) must also invest in "highly accurate short, medium ballistic missiles for land-attack, anti-invasion and anti-ship missions, plus appropriate air, ship and submarine platforms to carry them."[94] Moreover, the U.S. needs to procure additional long-range ballistic missiles to counter PLA A2/AD operations.[95] U.S. investment in a wide range of ballistic missile technology is an absolute necessity given China's aggressive missile development programs. As such, U.S. investments in this area could be a valuable tool in "raising the monetary stakes" of defense for China given the fact that ballistic missiles are harder to target, intercept, and counter than subsonic missiles.[96] The U.S. also needs to make ballistic missile technology available to its allies and partners in the region (i.e. Japan, South Korea, Australia, Taiwan, Philippines, Singapore, and Malaysia). This will serve as an effective threat to China's Navy, counter its arsenal of missiles, and force the Chinese to realize that military might alone will not be sufficient to dominate/control the region.[97] It is also important to have a viable delivery system for such weapons. As such, the U.S. Air Force and Navy need to "…jointly develop a long-range precision-strike family of systems that consists of ISR, airborne electronic attack, and strike assets."[98] Both the Air Force and Navy need to focus efforts on

manned and unmanned platforms. Currently both service rely heavily on short-range strike platforms, but moving forward into the future they need to place an increased focus on long-range options, which will be most critical in a Chinese A2/AD environment.[99]

In the true spirit of an Air-Sea Battle Strategy, the U.S. Air Force and Navy must come together to enhance their maritime strike capabilities. Aircrew employed on Air Force long-range platforms need to train with Navy maritime forces on how to conduct joint maritime strike and mining missions, which would be important to effectively enforcing naval blockades in the WPTO. Moreover, both services need to invest in and develop joint C2 mechanisms. These mechanisms will allow Air Force platforms to communicate with Navy ISR and targeting systems in order to facilitate streamlined engagement of enemy combatants. Finally, both services need to come together to plan, train, and exercise the tactics, techniques, and procedures (TTPs) needed to conduct joint maritime operations.[100]

Space is the ultimate high ground, and as such is a domain that demands U.S. attention. In January 2007 (as previously discussed), China successfully launched a ground-based medium-range ballistic missile into space to destroy a weather satellite, thus announcing its presence as a serious threat to future U.S. and allied space operations.[101] Eleven years prior to this, in August 1996, officers assigned to the U.S. Air Command and Staff College were seriously thinking about what the battlespace of tomorrow would look like, and devising strategies for the future. As such, they produced a report titled, *Star Tek- Exploiting the Final Frontier: Counterspace Operations in 2025.* The report remains highly applicable today, and offers the following thoughts and vision for the future:

> Space will be seen as a vital national interest based on its significant role in maintaining national security. In addition, the ability to operate freely in the space theater of operations will drive the United States (US) to implement capabilities to protect its vast array of space platforms as well as those of its friends and allies.

> Finally, the importance of space assets in achieving information dominance will force a serious examination of the requirement for developing offensive counterspace capabilities and placing nonnuclear weapons in space….
>
> In turn, kinetic and directed energy weapon systems will likely constitute the backbone of future offensive and defensive counterspace capabilities. A counterspace architecture must and will integrate enemy target detection, target identification, command and control, defensive counterspace capabilities, and offensive counterspace capabilities to expand the options available to future commanders.[102]

Unfortunately, the fiscal environment of today is much different than it was back in 1996. In a budget-constrained environment, the DoD will not be able to invest huge amounts of capital in a vast array of counterspace technology and programs. Therefore, the DoD must conduct a review of its counterspace Programs of Record, and course correct where necessary (i.e. eliminate and/or increase funding for applicable programs). The DoD must direct its focus and research on the most promising technologies (kinetic and non-kinetic) that will provide the most capabilities (both offensive and defensive) at costs that make sense. Until the U.S. develops sufficient counterspace technology, the DoD needs to plan on how it would conduct operations in an environment where space capabilities were lost or degraded. Under the Air-Sea Battle concept, the U.S. Air Force and Navy should develop future exercises in conjunction with each other that force personnel to operate in environments where space (i.e. GPS, etc.) , C2, ISR, and bandwidths are lost or severely degraded.[103] Moreover, the U.S. needs to ensure it has back-up systems, and the ability to deploy them to applicable locations in the WPTO when needed. Finally, the Air Force and Navy should invest in developing secure C2 technologies/networks in order to enhance the U.S. ability to operate in degraded environments.[104]

The cyber domain is another area that requires U.S. attention moving forward. Back in March 2010, the Pentagon stated that it had "…no doubt that the next conventional war will include a cyber element," and as such was taking steps to stand up U.S. Cyber Command.[105]

Brigadier General Charles Shugg, Vice Commander of 24th Air Force went on to say, "We [the Air Force] have become dependent on our information networks to accomplish our mission, and while those information systems have greatly improved our capabilities, they have become a significant target for our adversaries."[106] The same can be said of all networks across the DoD. Over the last decade, the U.S. has seen increases in cyber attacks against its networks. In February 2013, "…a private U.S. computer security company issued a study accusing a secretive Chinese military unit of being behind a series of hacking attacks on a wide range of American industries."[107] Reports like this and the growing trend of attacks in the cyber domain leave little doubt that a comprehensive Chinese A2/AD strategy most assuredly will include a significant cyber element. Therefore, the DoD should evaluate its current network structure, and determine whether continuation of an open structure is defensible, or if going to a closed, secure network is more advantageous moving forward. At the very least, the DoD needs to implement additional safeguards and protocols to protect its network infrastructure and systems in order to ensure success in future combat operations.[108]

Navy research, development and advancements will also be key to executing the Air-Sea Battle strategy. The Navy needs to continue developing their UUV program. UUVs will be vital to scouting out regions of the East and South China Seas, deploying surveillance sensors at key chokepoints and harbors, and tracking Chinese submarines.[109] Moreover, an A2/AD war like the one described in this paper will entail heavy use of ordinance from naval assets. The dynamics of such a battle assure that China will deny the U.S. access to seaports in the region where U.S. ships and submarines would normally go to rearm. Therefore, the Navy should develop a system to rearm both surface and submarine assets at sea.[110]

The DoD also need to re-examine plans for its 5th and 6th generation fighter programs in the face of Chinese advancements. According to Richard D. Fisher Jr., Senior Fellow at the International Assessment and Strategy Center:

> By the end of this decade the PLA could have two 5th gen fighters in production, the Chengdu 'J-20' and the Shenyang J-31 Falcon with perhaps another two in advanced development by the early 2020s. Chinese sources suggest 'J-20' production could reach 300, the potential this could be increased by other 5th gen types, while Russian industry sources believe they can sell up to 600 of the PAK-FA Sukhoi T-50 5th gen fighter, all of which makes clear the insufficiency of having ended the F-22 production at 187.[111]

The DoD plans to purchase 2,443 F-35 5th generation fighters, but they do not possess the same capabilities as the F-22 Raptor.[112] The Navy/Marine Corps needs to proceed with plans to replace its aging F/A-18E/F Super Hornets and AV-8 B Super Harriers with the upgraded F-35B/C Joint Strike Fighters. The U.S. must also continue offering the F-35 to its allies in order to counter Chinese influence in the region. Additionally, the Air Force should revive production/initiate upgrades to the F-22 program, and bring back/continue work on air-to-air missile programs like the Next Generation Missile (NGM) and Net Centric Air Defense Element (NCADE).[113]

Finally, the U.S. ground-based missile defense program demands immediate attention. The Intermediate-Range Nuclear Forces (INF) Treaty of 1987 between the U.S. and the former Soviet Union (now Russia) inhibits U.S. options when it comes to missile defense against China. Under the provisions of the treaty, the U.S. and the Soviet Union were required to destroy all, "…ground-launched ballistic and cruise missiles with ranges of between 500 and 5,500 kilometers, their launchers and associated support structures and support equipment…."[114] China is not part of this treaty, and its insistence on building missiles is destabilizing the region. Back in January 2011, the *Washington Post* stated the following:

> More ominous still is that China's missile buildup could result in the INF's demise. Moscow has already threatened to pull out if China does not sign the treaty. And, with its tactical fighter bases and surface ships increasingly vulnerable, the United States also may have no choice but to abrogate the treaty and deploy mobile land-based missiles - a capability much more difficult for China to attack - to places such as Japan; this could become the only way to deter Chinese aggression.[115]

The INF Treaty does not include U.S. Air and Naval forces, and as such, they can carry ballistic and cruise missiles with ranges between 500 and 5,000 kilometers.[116] However, in an A2/AD environment, the ability of U.S. Air and Naval forces to operate from effective ranges/bases within the First and Second Island Chains of the Western Pacific, especially during the early stages of the conflict, is highly unlikely. The INF Treaty also does not cover U.S. Intercontinental Ballistic Missiles (ICBMs). Therefore, ICBMs could be an option for launching ground-based strikes from the U.S. at China. However, there is no way to distinguish whether ICBMs are carrying conventional or nuclear warheads. This could prompt the Chinese to launch nuclear weapons in response to U.S. ICBMs, which would be disastrous for the region/world. Therefore, the U.S. must force China to sign the INF Treaty, or withdrawal from it altogether thus giving the U.S. additional ground-based ballistic missile options for promoting its interests in the region.[117]

Conclusion

The U.S. has a vital interest in the Asia-Pacific region of the world. U.S. commitment to key allies and partners along with its vision for security and stability have shaped national policy, and driven a historic call from the President to refocus attention on the region. Over the past decade though, a new actor has arrived on the scene to challenge U.S. dominance in the Asia-Pacific. This paper analyzes China's massive military growth, emerging capabilities, and presents a viable mechanism for countering its A2/AD threat as demonstrated by application of the Air-Sea Battle strategy to a hypothetical model/scenario. Finally, the paper highlights U.S.

capabilities and vulnerabilities, and discusses actions the country must take in order to ensure it remains a viable player capable of wielding power and influence in the region during the next decade/into the future.

There are major implications associated with the application of an Air-Sea Battle strategy. First, the U.S. Air Force and Navy must forge a deeper more integrated partnership moving forward for this strategy to work. This means that each service must take a hard look at what they do, how it would support the other service, and how it would meet the DoD's mission of projecting military might as an instrument of national power. It also, means that each service must work with the other when developing technologies for the future. Compromise will be a key to success as each service "gives and takes" in order forge a unified path moving forward. Therefore, each service will assume an inherent level of risk as it resists the temptation to resort to "old school" parochialism, and a mindset of doing what is in the best interest of the service vice the nation. The threat from China is too great for the U.S. to pursue such a path.[118] Furthermore, China's emergence on the scene as a major power in the Asia-Pacific along with its projected growth over the next decade presents a serious challenge to U.S. interests in the region. The U.S. has a small window in which it must act to counter China's massive military development and growth. Failure to do so would result in the U.S. "falling behind" militarily. This would be devastating to the U.S.'s allies and partners who rely on the U.S. to counterbalance China, and maintain peace and stability in the region.[119] Finally, with great challenges, come requirements to make sound decisions for the future. The U.S. ended the war in Iraq, and is bringing to a close the war in Afghanistan. This coupled with the nation's huge national debt will lead many to look at the DoD's budget as a logical place to start cutting. Sequestration and the nearly half a trillion dollars in projected budget cuts over the next five

years are testament to this kind of thinking.[120] In times like this, the country must remember President Obama's speech to Australia's parliament back in November of 2011 in which he stated, "[U.S.] interests in the [Asia-Pacific] demand our enduring presence in this region. The United States is a Pacific power, and we are here to stay. As a result, reductions in U.S. defense spending will not—I repeat, will not—come at the expense of the Asia Pacific."[121] As such, the U.S. must relook at its DoD budget projections/allocations, its commitments, and make wise decisions and sound investments in order to maintain its strong, influential, stabilizing presence in the Asia-Pacific region.

GLOSSARY

A2/AD	Anti-Access/Area-Denial
ASBM	Anti-Ship Ballistic Missile
ASCM	Anti-Ship Cruise Missile
AEW	Airborne Early Warning
AF	Air Force (U.S.)
ASAT	Anti-Satellite
ASUW	Anti-Surface Warfare
ASW	Anti-Submarine Warfare
AWACS	Airborne Early Warning and Control
BDA	Battle Damage Assessment
BMD	Ballistic Missile Defense
C2	Command and Control
CSG	Carrier Strike Group (U.S.)
DoD	Department of Defense (U.S.)
EA	Electronic Attack
EP	Electronic Protection
EW	Electronic Warfare
GPS	Global Positioning System
HALE	High Altitude Low Observable
JASDF	Japanese Air Self Defense Force
IADS	Integrated Air Defense System
ICBM	Intercontinental Ballistic Missile
INF	Intermediate-Range Nuclear Forces
ISR	Intelligence, Surveillance and Reconnaissance
LEO	Low Earth Orbit
MRBM	Medium-Range Ballistic Missile
NCADE	Net Centric Air Defense Element
NGM	Next Generation Missile
OTH-B	Over-the-Horizon Backscatter
OTH-SW	Over-the-Horizon Surface Wave
PLA	People’s Liberation Army
PLAAF	People’s Liberation Army Air Force
PLAN	People’s Liberation Army Navy
PGM	Precision-Guided Munitions
POL	Petroleum, Oil, and Lubricants
PRC	People’s Republic of China
SAM	Surface-to-Air Missile
SLOC	Sea Lines of Communication

SBIRS	Space-Based Infrared System
SRBM	Short-Range Ballistic Missile
SSBN	Ballistic Missile Submarine
SSG	Guided Missile Submarine
TTP	Tactics, Techniques, and Procedures
UAV	Unmanned Aerial Vehicle
UUV	Unmanned Undersea Vehicle
WMD	Weapons of Mass Destruction
WPTO	Western Pacific Theater of Operations
3GIRS	Third-Generation Infrared System

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